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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/559,310

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Jan Tue Ravnkilde

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EXAMINER

LERUNG, QUYEN PHAN

ART UNIT

PAPER NUMBER

2874

MAIL DATE

DELIVERY MODE

05/23/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/559,310

Applicant(s)

RAVNKILDE ET AL.

Examiner

QUYEN P. LEUNG

Art Unit

2874

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 February 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 40-72 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 40-72 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-946)
- 3) ☐ Information Disclosure Statement(s) (PTO/SE/US)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Response to Amendment

In response to applicant's amendment filed 2/15/2008, claims 40, 41, 51, 68, and 70 have been amended. Claims 40-72 are pending.

Response to Arguments

Applicant's arguments with respect to claims 40-72 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 40-72 are rejected under 35 U.S.C. 103(a) as being unpatentable over Smith (2003/0038327) in view of Bishop et al (6,400,009).

Smith discloses the claimed invention, but is silent as the particular thickness of the intermediate layer being within a range of 10-1000 micrometers.

- Re claim 40, Smith's figures 1-2 illustrate an optical microelectromechanical structure (MEMS 100) comprising: (i) at least one optically transmissive layer (UTL, 126, see paragraph [0033] for the teaching of element 126 being of glass and therefore inherently being optically transmissive); (ii) at least one intermediate layer structure (IL, 136, 136a); (iii) at least one device layer (DL, 104); and (iv) a sealed package (100, see title) wherein the intermediate layer structure (IL 136, 136a) facilitates one or more optical paths (OP) between the optically transmissive layer (UTL 126) and the device layer (DL, 104) and wherein the intermediate structure layer (IL 136, 136a) defines a distance (d) between the optically transmissive layer (UTL 126) and the device layer (DL 104).
 - Re claims 41-44, 49, 62, 65, see Smith's paragraph [0035] lines 3-7 for the inherently electrically insulating layer(s) for the intermediate layer (136).
 - Re claims 45-48, note Smith's plate structure (126) and opening means (134).
 - Re claim 50, note columns (136, 136a).
 - Re claim 51, note base layer (128) to which the device layer (104) is attached.
 - Re claims 54 and 63, see paragraph [0033] for the teaching of the base layer (128) and the optically transmissive layer

(126) being inherently optically transmissive because of the material of Pyrex glass teaching.

- Re claims 52-53, figure 2 clearly shows this.
- Re claim 56, see paragraphs [0030] and [0031] for movable parts of actuators.
- Re claims 60-61, 72, figure 2 clearly shows this.
- Re claim 64, see paragraph [0031] for the silicon device layer (104); and see paragraph [0032] line 3 for any doping.
- Re claim 68, Smith discloses a method of manufacturing an optical microelectromechanical structure (MEMS, 100) by bonding at least one optically transmissive layer (UTL) (126, 128—see paragraph [0033] for teaching of glass which is inherently optically transmissive) with at least one intermediate layer structure (IL) (136, 136a), and at least one device layer (DL) (104) to form a sealed package (see title), whereby optical transmission is facilitated between the optically transmissive layer (UTL) (126, 128) and the device layer (DL) (104) by removal of at least a part of the intermediate layer structure (IL) and whereby the distance between the transmissive layer (UTL) and the device layer (DL) is defined by the thickness of the intermediate layer structure.
 - Re claim 69, see paragraph [0042] for the etching of the device layer (silicon wafer 104).

Bishop et al relates to a hermetic firewall (or intermediate layer) **30** for MEMs packaging in flip-chip bonded geometry. In col. 3 line 62 through col. 4 line 2 Bishop et al teaches that the height of the firewall **30**, or intermediate layer, can be precisely controlled to thereby control the spacing between the two substrates **40,70**, or UTL and DL, and that depending on the particular MEMs application that spacing may be an integral part of the MEM device function, while in others it has to be simply large enough to accommodate the MEMs devices in the cavity **20**.

Thus, it would have been an obvious choice of design to one of ordinary skill in the art at the time the invention was made to modify Smith to have the intermediate layer being within the wide range of 10-1000 micrometers, for the advantageous benefit of making the MEMs structure suitable for its particular application, as suggested by Bishop et al.

Re claims 41 and 70, Smith in view of Bishop et al has been discussed above, except for intermediate layer structure (IL) further comprising at least one electrically insulating layer having a thickness in the range of 0.1-3 micrometers. Attention is directed to Smith's paragraph [0035] lines 3-7 for the inherently electrically insulating layer(s) for the intermediate layer (136). Next, attention is directed to Bishop et al's col. 4 lines 17-32 which teaches materials for the IL (firewall), including at least one electrically insulating layer. Lacking any stated criticality it would have been an obvious choice of design to employ in the device of Smith in view of Bishop at least one electrically insulating layer having a thickness in the range of 0.1-3 micrometers.

Re claims 55, 57-59, 66-67, 71, Smith in view of Bishop et al has been discussed above except for the base layer being provided with through-holes (claim 55); or the intermediate layer comprising an insulating layer of a SOI wafer (claim 57); or the base layer or the optically transmissive layer comprising microlenses (claims 58-59); a light modulator arrangement including at least one movable microshutter (claims 66-67) or etching of the intermediate layer (claim 71).

Re claim 55, lacking any stated criticality it would have been an obvious choice of design to one of ordinary skill in the art to modify Smith in view Bishop et al by employing the through-holes when the base layer is optically non-transmissive.

Re claim 57, insulating layer of a SOI wafer is a well-known material. Lacking any stated criticality it would have been an obvious choice of design to one of ordinary skill in the art to modify Smith in view Bishop et al by employing insulating layer of a SOI wafer.

Re claim 58-59, microlenses are known for collimating or focusing light. It would have been obvious to one of ordinary skill in the art to modify Smith in view Bishop et al by employing the microlenses so as to advantageously collimate or focus light.

Re claims 66-67, Smith in view Bishop et al is silent to a light modulator arrangement including at least one movable microshutter. However, it is known to use MEMS device as a movable microshutter. It would have been obvious to one of ordinary skill in the art to employ the MEMS device of Smith in view Bishop et al as a microshutter. A recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to

patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim.

Re claim 71, Smith in view Bishop et al is silent to the etching of the intermediate layer. Lacking any stated criticality it would have been an obvious design choice to one of ordinary skill in the art to modify Smith by employing well-known etching step.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Ma (6,808,955) teaches a method of fabricating an integrated circuit that seals a mems device within a cavity. Blair et al (7,003,192) teaches a micro opto electro mechanical device.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quyen P. Leung whose telephone number is (571) 272-8188. The examiner can normally be reached on normally M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rodney Bovernick can be reached on (571) 272-2344. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Quyen Leung/
Quyen Leung
Primary Patent Examiner
Group Art Unit 2874

qpl